

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : <b>G06F</b>		<b>A2</b>	(11) International Publication Number: <b>WO 00/31607</b>
			(43) International Publication Date: 2 June 2000 (02.06.00)
(21) International Application Number: PCT/IB99/01806 (22) International Filing Date: 10 November 1999 (10.11.99) (30) Priority Data: 60/109,249      19 November 1998 (19.11.98)      US 60/116,334      19 January 1999 (19.01.99)      US 09/339,625      24 June 1999 (24.06.99)      US (63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application US      09/339,625 (CON) Filed on      24 June 1999 (24.06.99) (71) Applicant (for all designated States except US): TIMEBE, LTD. [IL/IL]; Habarzel Street 31, 69710 Tel Aviv (IL). (72) Inventors; and (75) Inventors/Applicants (for US only): GEFEN, Eldad [IL/IL]; Ptachia Street 49, 69549 Tel Aviv (IL). RONEN, Uziyahou [IL/IL]; Binyamini Zvi Street 27, 47205 Ramat Hasharon (IL). ZISAPEL, Zohar [IL/IL]; Hanechoset Street 12, 69719 Tel Aviv (IL).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>Without international search report and to be republished upon receipt of that report.</i>	
(54) Title: METHOD AND SYSTEM FOR CONDUCTING COMMERCE OVER A COMPUTER NETWORK (57) Abstract <p>A method and system are provided for conducting electronic commerce over a computer network such as the Internet. People desiring to buy one or more products or services access the system and enter the product(s) they desire to purchase, along with desired purchase price and other suitable information. The system then groups together similar buyers based on one or more factors, such as the product(s) they desire to purchase, the time-frame in which they desire to make the purchase, the price they are willing to pay, and the like, and assembles and manipulates the data into relevant sub-groups of data. The system makes such information available to one or more sellers and/or suppliers, and the sellers and/or suppliers decide, based upon the sub-groups of data, at what price they will sell the product(s).</p>			

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

METHOD AND SYSTEM FOR CONDUCTING  
COMMERCE OVER A COMPUTER NETWORK

This application claims priority from provisional patent applications serial numbers 60/116,334, filed on January 19, 1999, and 60/109,249, filed on November 19, 1998, the disclosures of which are hereby expressly incorporated by reference.

FIELD OF THE INVENTION

The present invention generally relates to the field of data communications and electronic commerce. More specifically, the invention is directed to a method and system for creating groups of potential buyers and of presenting those created groups to the appropriate sellers and/or suppliers.

BACKGROUND OF THE INVENTION

Computer networks, such as the Internet, bring people from all corners of the world together, providing for the exchange of ideas, information, and the like. The Internet is fast replacing other more conventional means of communication, such as the mail and telephone.

One use of the Internet that is gaining widespread popularity is conducting business over the Internet (i.e., electronic commerce). Many merchants (i.e., online merchants) have created web pages that display the goods being offered for sale by them.

People can access those web pages and shop for various goods, such as books, music, and many other products, and can make purchases over the Internet by supplying the appropriate financial information, for example a credit card number. This type of transaction is termed "seller side" since it is the seller which dictates the price, product, etc., and it is the buyer which accepts the seller's offer to sell. Because the Internet allows people from different parts of the world to communicate, buyers and sellers can be linked without requiring them to be in the same geographic region. For some new businesses, the

only way a buyer can access the business is through the Internet.

One form of this on-line, electronic commerce is on-line auctions, in which sellers (e.g., individuals or businesses) list products that are available for purchase on a web site created for such a purpose. Buyers then may access the web site and place bids  
5 on those products that are of interest to them. Typically, the auction ends at a predesignated time, and the buyer who placed the highest bid for a product is allowed to purchase the product at the bid price. The buyer and seller then communicate directly and arrange for payment, delivery, and the like.

A similar form of on-line commerce, which is gaining popularity, is a  
10 "buyer-side auction", in which every transaction involves a single buyer who lists the product or products he or she desires, along with the price they are willing to pay, on an appropriate web site. Sellers can then access the web site and review the products being sought. If a particular seller has one or more of the products listed and is willing to sell it for the price set out by the buyer, the seller selects the product request, and the buyer and  
15 seller then communicate directly and arrange for payment, delivery, and the like.

While the above-mentioned methods and systems do bring buyers and sellers together, including buyers and sellers who are miles apart, those methods and systems are not at all concerned with minimizing the price that the buyers must pay for certain goods or services. For example, in the case of the buyer-side auction, if a buyer desires a  
20 particular product at a particular price, the first seller to accept the offer makes the sale at the buyer's set price, even though another seller may have had the product and been willing to sell the product for less money. In addition, the prior methods only serve to link a single buyer with a single seller per transaction, which is oftentimes inefficient.

Accordingly, it will be apparent to those skilled in the art that there continues  
25 to be a need for a method and system for conducting electronic commerce which optimizes the terms of sale for the buyer, while simultaneously providing a beneficial service to sellers and suppliers. The present invention addresses these needs and others.

#### SUMMARY OF THE INVENTION

30 According to the present invention, a method and system are provided for conducting electronic commerce over a computer network such as the Internet. People

desiring to buy one or more products access the system and enter the product(s) they desire to purchase, along with desired purchase price and time frame information. The system then groups together similar buyers based on one or more factors, such as the product(s) they desire, the time-frame in which they desire to make the purchase, the price they are  
5 willing to pay, and the like, and assembles and manipulates the data into relevant sub-groups of data. The system makes such information available to one or more sellers and/or suppliers, and the sellers and/or suppliers decide, based upon the sub-groups of data, at what price they will sell the product(s). The buyers are then notified whether they are able to purchase the specified product at their desired price, or possibly a lower price. In this  
10 manner, by grouping multiple buyers together in a single transaction, the price each buyer will pay for the product(s) may be reduced.

In one embodiment, the system generates a demand curve for each assembled group of similar buyers. The demand curve is made available to the relevant sellers and/or suppliers. The sellers and suppliers can analyze the curve and determine the number of  
15 buyers willing to purchase at different prices. The sellers can then choose to supply a particular quantity of products at a certain price.

The present invention may be implemented using a computer network-based system to allow access by buyers and sellers. The network-based system includes a processor operative to receive information from the buyers and to assemble the information  
20 into appropriate groupings and to make such grouped information available to the sellers and/or suppliers.

Thus, the system of the present invention in one illustrative embodiment includes a central computer system comprising an interface to communicate with remote buyers over a communications network facility, and a processor programmed to receive  
25 buyer information from a number of buyers, to assemble and group the information into sub-groups, and to make the information available to respective sellers and/or suppliers over the communications network facility.

The system may further include a disk subsystem memory, and/or a database to collect and store data in the form of buyer registration information, seller information,  
30 and product information.

An illustrative method according to the present invention includes the steps

of: receiving information from a number of potential buyers; grouping buyers together based on one or more types of information provided by the buyers; and, providing at least a portion of the information to one or more sellers.

## 5 BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, features and advantages of the invention discussed in the above summary of the invention will be more clearly understood when taken together with the following detailed description of the embodiments which will be understood as being illustrative only, and the accompanying drawings reflecting aspects of those embodiments,

10 in which:

FIG. 1 is a block diagram of a system for conducting electronic commerce comprising one illustrative embodiment of the present invention;

FIG. 2 is a flow chart depicting a portion of the operational flow of the system of FIG. 1;

15 FIG. 3 is a flow chart depicting another portion of the operational flow of the system of FIG. 1; and

FIG. 4 is an example of a demand curve generated by the system of FIG. 1 in one illustrative embodiment of the present invention.

## 20 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, and particularly to FIG. 1, there is shown a system 10 for conducting electronic commerce which comprises an illustrative embodiment of the computer network-based system of the present invention. Generally, the system includes a central computer system 12 for receiving, processing, and making  
25 available to sellers buyer-supplied data. The central computer system is connected to a communication network facility 14 which provides for communication via telephone lines, data lines, or a functionally equivalent link to a number of remote buyers, each located at a respective terminal 16, and to a number of remote sellers, each located at a respective terminal 18. The "terminals" referred to herein may be computers, telephones, facsimile  
30 machines, or any other device allowing communication with the central system 12.

It will be apparent to those skilled in the art that the communication network

facility 14 may be a telephone, facsimile, or data network system, a cellular telephone system, face-to-face, or any suitable communication system. As is well known in the art, data may be transmitted over a conventional telephone network system, and data terminals can be attached to a cellular telephone for receiving and sending information. In addition, 5 the communication network facility may include the Internet, a wide area network (WAN), a local area network (LAN), local computer terminals, or other suitable computer-based network. Thus, it will be apparent that any communications network facility which allows for the transmission of data is suitable for use with the central computer system 12 of the present invention.

10 The central computer system 12 in one illustrative embodiment includes a private system and preferably is located at the service provider's or similarly secure facilities. Alternatively, the system 12 may be part of a public network. For example, Internet service providers such as CompuServe®, America Online®, Earthlink®, and others provide access to the service provider's web site to thereby make the data available to 15 subscribers. Thus, it will be apparent that the system 10 of the present invention can either be implemented as a private network, or may be implemented in connection with a public network, for example, the Internet.

In one illustrative embodiment, the central computer system 12 includes a number of communication ports  $C_1$  through  $C_m$  connected to the communication network 20 facility 14 for simultaneous, two-way communication with one or more of the buyers 16 and/or sellers 18. The respective communication ports  $C_1$  through  $C_m$  are also connected to an interface 19 which is part of the central computer system 12 and represents and incorporates well known hardware and software structures.

The central computer system 12 further includes a processor 20 and memory 25 22. The processor 20 is coupled to the interface 19 to communicate information with the remote buyer terminals 16 and with the remote seller terminals 18, as described in greater detail below. The memory 22 is electrically connected to the processor, and receives and stores data entered by the buyers, such as desired product information, as well as buyer registration information supplied by the buyers upon registering with the system 12. The 30 memory also receives and stores data entered by the sellers, such as sale price information and the like. The memory also receives and stores rating data on products, buyers'

histories, and sellers' histories.

In one illustrative embodiment, the memory 22 is hierarchical and may include cache memory, RAM memory, disk subsystem memory, optical media, and/or tape and remote storage devices that can be accessed as needed.

5 One buyer terminal 28 is shown in detail in FIG. 1. Because each remote buyer or seller terminal can be identical in material respects, only one is shown and described in detail. The remote terminal 28 includes an interface 30 having well known hardware and software structure such as a modem, tone decoder, networking interface, and the like. The modem initiates a connection via the communication network facility 14 to  
10 the central computer system 12. The interface 30 also connects with an internal data bus 32, which transmits data between the different components within terminal 28. The remote terminal 28 further includes a processor 34, a buffer storage 36, a memory 38 for long term or permanent storage, a user input/output ("I/O") device 40, and a display 42, all of which are coupled to the data bus 32, as is well known to those skilled in the art.

15 The special features of the system of the present invention are implemented, in part, by software programs stored in memory 22 of the central computer system 12. The software programs are stored in one or more preselected data files and are accessible by the processor 20, the function of which is described in greater detail in connection with FIGS. 2 and 3.

20 Referring now to FIG. 2, the operation of the system 10 of the present invention is described in conjunction with the above structural description of the central computer system 12 and the remote terminals 28. As illustrated in FIG. 2, the process begins when one of the remote terminals 28 of a potential buyer accesses the central computer system 12 (step 44). As described above, this is accomplished via the  
25 communication network facility 14. Alternatively, a buyer could place a telephone call to an operator, who could elicit the desired product and terms-of-sale information from the buyer and enter such information directly into the central computer system 12. Also, a buyer could provide the product and terms-of-sale information by way of facsimile or the like, with a data entry person entering such information into the system 12.

30 In the preferred embodiment, once communication is established with a buyer's terminal 28, operation flows to query block 46, and the system 12 determines



whether the buyer requests information from the system. Such information can be in the form of general product information, product rating information, supplier rating information, information regarding terms and conditions for various products, and the like. If the buyer desires such information, operation proceeds to step 48, and the buyer is  
5 provided with the information he or she requests. Operation then proceeds back to query block 46.

If the buyer does not seek any product information, operation then flows to query block 50, and the system determines whether the buyer wishes to enter an offer to order. If not, operation proceeds to step 58, and the session ends. If so, operation instead  
10 proceeds to step 51, where the buyer enters information regarding a product he or she desires to purchase. In one embodiment, the central computer system 12 provides the buyer with a number of category selections which may, for example, be displayed on the buyer's remote terminal display 42. For example, the available selections may be "Cars", "Computers", and the like. The buyer then simply selects one of the categories via the I/O  
15 device 40, and receives sub-category lists and proceeds to select a particular maker, model, and the like.

The information entered by the buyer may be minimal or relatively detailed, either at the buyer's option, or alternatively at the system's option. For example, a particular buyer may wish to purchase a 19" television, but have no preference regarding  
20 the manufacturer or regarding any optional features, such as picture-in-picture and the like. Thus, the buyer would simply choose the category of "Televisions", select a 19" television, and the entry of product information data would end, by means of the buyer selecting an appropriate icon on the display 42 or pressing an appropriate key. Alternatively, the buyer may want to purchase a television from a particular manufacturer. The buyer can enter  
25 such information as well, either making the manufacturer a preference, or a requirement. Optionally, the buyer can also specify a value for each option available or desired in the product. The system 12 receives all such information and stores it in memory 22 for future retrieval and processing.

In addition to product and price information, the buyer may enter terms and  
30 condition information, such as a desired warranty, shipping details (costs and/or time), service options, and the like. This information can be made a condition of sale by the

buyers, or simply a preference, and is supplied to the seller(s) in addition to the product and price information. Also, the buyer may enter a geographic parameter for certain goods, such as groceries and the like. The accepting seller would then be required to be located within some range from the buyers' locations, or to make the goods available within that  
5 range.

The system 12 also allows a buyer to enter multiple offers to order for the same type of product. For example, a buyer may be willing to pay \$100 for a television from one manufacturer, and \$80 for a similar television from a different manufacturer. The buyer can enter both offers to order, and then may rank the two offers to order in terms of  
10 priority. When the offer to order information is provided to a seller, this buyer preference information may also be provided, so that the seller knows of the buyers' preferences. In the event the seller only has available for sale the buyers' second choice, and is willing to sell the product at or below those buyers' prices, those buyers are notified and can then decide whether to purchase the product from that seller, or wait to see if another seller will  
15 sell their first-choice product at or below their prices. In this manner, the buyers can enter multiple offers to order for similar products, without being forced to buy more than one of the products. Alternatively, the buyer may not have a preference between the two products. In that case, the first seller to accept the buyer's offer makes the sale, and the buyer's other offer(s) to order are automatically retrieved by the system and marked as  
20 removed or expired within memory 22, such that the buyer cannot be entered into two purchase contracts.

In one illustrative embodiment, the system 12 allows a buyer to add a product not already listed by the system as one of the available products. For example, if a buyer wants to purchase a 35" television, but the selections provided by the system only  
25 include 19" and 25" televisions, the buyer may select an appropriate icon, and enter the appropriate information regarding the item to be added. The system then stores the information in memory 22 and automatically updates its category list in memory to include 35" televisions, so that the newly added product is presented to subsequent buyers who may then select that product and be joined with the first buyer into a sub-group. Sellers may  
30 also have access to add their products as categories, with the system 12 storing such entered information in the system memory 22.

Once the buyer has finished entering the product information, the central computer system 12 queries the buyer for price and time-frame information, and the buyer enters such information, at step 52. Again, the buyer has several options available. The buyer may select both a desired price and a maximum price, or simply a maximum price.

5 With respect to the time-frame information, the buyer may indicate a specific time period, for example, one week, one month, or any other period of time, or alternatively may indicate an open-ended offer which is valid until an acceptable seller is found. It is contemplated that groups of buyers will be assembled and presented to suppliers, for example, once every two weeks, and the date of the next "presentation" is preferably  
10 provided to the potential buyer when the buyer is entering the product information so that he or she knows when the next presentation is to take place. Thus, a buyer may select as a time frame two weeks, and only be part of the next presentation made to sellers and/or suppliers. Alternatively, the buyer may select as a time frame a period of one month, and be part of the next two presentations, assuming the buyer's price is not met in the first  
15 presentation, as is discussed in further detail below. Alternatively, a grouping may be based upon a predetermined number of buyers. For example, the system 12 may create a sub-group when twenty buyers of a specific car make, model, and option package have entered offers to order into the system. The system could then immediately present such information to the appropriate seller(s), as is described in greater detail below.

20 Alternatively, a seller may initiate a sub-group by accessing the system 12 and entering the appropriate product or service information, time-frame information, and the like. Then, when potential buyers access the system seeking to purchase the same product or service, those buyers are grouped together into the sub-group initiated by the seller.

25 Continuing with the example shown in FIG. 2, after the buyer enters the price and time-frame information, operation proceeds to step 53, and the system queries the buyer whether he or she is a registered user. If so, operation proceeds to step 54, and the buyer is prompted for an account number, login name, or the like. If the buyer is not a registered user, operation flows to step 55, and the buyer enters personal information, such  
30 as name, address, credit card information, social security number, and the like, and optionally pays a fee for the service.

In either case, after the buyer has registered or entered his or her account information, operation proceeds to step 56, and the offer to order information is stored in memory for subsequent retrieval and processing. Operation then proceeds to query block 57, and the system 12 determines whether the buyer wishes to end the session. If so,  
5 operation flows to step 58, and the session ends. If not, operation flows back to block 46.

It will be apparent that the registration procedure in steps 53 through 55 can alternatively be carried out initially, i.e., before operation proceeds to step 51 and the buyer enters product information. The registration process, as with the offer to order process, can alternatively be conducted through any other communication means, or any combination  
10 of such means. For example, a buyer may enter all of his or her registration information through a computer network, except for credit card information, which can be conducted via facsimile, telephone, or the like, and entered into the system by a system operator.

The above process is repeated as different buyers access the system 12 and enter desired product information, price information, and time-frame information. The  
15 system 12 continues to gather the information and store the information in memory 22.

Referring now to FIG. 3, additional functions of the system 10 are described. The central computer system 12 is preferably programmed to retrieve and process the data stored in memory 22 either on-line (i.e., as the data is received) or at selected intervals, for example, every two weeks. Thus, for the preceding two-week period before the system 12  
20 retrieves and processes the data, the system 12 receives multiple offers to order from various potential buyers, at step 60. The offer-to-order process was described above in connection with FIG. 2. At the preselected time, the system 12, and in particular the processor 20, is programmed to retrieve the data from memory 22, and to sort the offers to order into relevant sub-groups, at step 62. For example, all of the buyers who seek to  
25 purchase a 19" television from Acme Manufacturer will be assembled into one group (the "Acme 19" television group"), while all buyers who seek to purchase a particular brand and/or model of computer will be assembled into another group. In this manner, all buyers of similar products are assembled into the relevant groups or sub-groups. Sub-groups may also be determined based upon the geographic locations of the buyers, for example, when  
30 the buyers place offers to order for perishable goods such as groceries and the like.

In one illustrative embodiment, as is described above, the buyers are grouped

together into sub-groups as the data is received from the buyers. Thus, when a subsequent buyer accesses the system 12, he or she may determine how many buyers are in a relevant sub-group and may make an educated guess as to the likely sales price for the product based on the number of buyers in the sub-group. In this embodiment, the first buyer to enter an offer to order a specific product will initiate the sub-group for that product, and will set the closing date for the sub-group. Subsequent buyers will then be added to the sub-group, either by selecting that particular sub-group, or by entering corresponding product and time-frame information.

Alternatively, in the illustrative embodiment where the system 12 processes the data in real-time, a seller may initiate a sub-group by entering product information and time-frame information. The system then creates a sub-group based on the information entered by the seller, and when a buyer enters the appropriate product information and time-frame information, he or she is added to the sub-group initiated by the seller. Alternatively, a buyer may be presented with information relating to the current sub-groups, and may simply select one of the sub-groups and be added to that sub-group.

When a seller initiates a sub-group, it may be for various types of products, services, and the like. In addition, the type of sub-group may vary. For example, the seller may initiate a volume sale, in which the seller will enter one or more price steps depending on the total number of units buyers elect to buy. For example, if the buyers in the sub-group elect to cumulatively buy 100 units of a product, the price will be an amount selected by the seller, for example, \$10 per unit, but if the buyers elect to buy 200 units, the price will be another amount, for example, \$8 per unit. The buyers are preferably presented with the price steps (or at least some portion of the information) so that they can make an informative decision regarding how many units to buy.

Once the system 12 assembles the various sub-groups and the time frame in which additional buyers can join the sub-group expires, the system preferably generates a demand curve for each sub-group, at step 64. As shown in FIG. 4, the demand curve demonstrates to sellers and suppliers the number of available buyers at different purchase prices. As an example, the demand curve shown in FIG. 4 shows two curves, one for buyers' desired prices, and one for maximum prices the buyers would be willing to pay. Thus, for the desired price curve, if a seller is willing to sell his products for \$100 each,

the system has the names of twenty buyers willing to purchase the product. If the seller instead is willing to sell his products for \$75 each, the system has the names of forty buyers willing to purchase the product. In this manner, the seller can make an informed decision regarding the price at which to sell the product, knowing how many sales the seller will  
5 make at the various different prices.

While the demand chart shown in FIG. 4 includes two different curves, one for desired prices and one for maximum prices, it will be apparent that the demand curve provided to the sellers could have only one curve. For example, the system 12 may initially provide each of the relevant sellers with a demand curve showing the desired price  
10 curve. If none of the sellers is willing to sell at those prices, the system 12 may be programmed to then provide the sellers with a new demand curve showing the maximum price curve or some price in between the two. While the demand curves shown in FIG. 4 are linear, it should be understood that the demand curve may take on any shape, depending on the buyer information.

15 In addition, while generating demand curves is one preferred method of providing the buyer-supplied information to the appropriate sellers, other methods for providing such information are available. For example, the system 12 may simply provide each seller with information regarding the desired product and the number of potential buyers for that product, and withhold the price information. Each seller may then respond  
20 by bidding a price it is willing to sell the product to each buyer. The system 12 may then select one of the bids, based upon the prices bid by the sellers, the sellers' ratings, or some combination of factors, so long as the bid is at or below the maximum prices entered by at least some of the buyers.

In the preferred embodiment, after the demand curves are generated, the  
25 system at step 66 makes those demand curves available to the various sellers and suppliers, along with any terms and conditions information entered by the buyers, system operators, and/or the sellers. Making such information available to the sellers can be accomplished in various ways. In one embodiment, the sellers can access the system 12 to view the relevant demand curves. For example, a vendor of electronics equipment will be interested  
30 in the demand curves for televisions, VCRs, and the like, and will access and review those demand curves to determine whether the vendor wishes to supply a particular product to

a group of buyers, and with the terms and conditions dictated by the buyers. In another embodiment, the system 12 is programmed to contact the various sellers directly and to transmit the appropriate demand curves and terms and conditions information to the respective sellers. In yet another embodiment, agents of the system operator communicate  
5 and negotiate prices with sellers.

At step 68, the sellers who desire to make a sale transmit such information to the system 12. Such information will preferably include the product, the sale price the seller is willing to meet, and the quantity of product to be supplied. Then, at step 70, the system chooses the winning supplier or suppliers, and optionally charges those suppliers  
10 a fee. It is envisioned that in many instances two or more sellers will accept the offers of the same buyers, but at different prices. For example, one seller may review the demand curve and decide to sell the product at \$100 to twenty buyers, while another seller decides to sell at \$75 to forty buyers. The system will then select one of the sellers, preferably choosing the seller with the lowest acceptance price. In this manner, the terms of sale for  
15 the buyers are optimized, i.e., minimized. Other criteria may be added to the selection process, such as supplier ratings, suppliers' geographic locations, and the like.

At step 72, the system 12 transfers a list of buyers to the winning seller who is to provide them with products, and transmits an electronic message to each of the buyers, informing them that a seller has been found and indicating to them the accepted price and  
20 seller's details. The buyer can then contact the seller directly to coordinate payment, shipping, and the like.

Preferably, after the seller is provided with the names of the buyers, all further dealings, such as arranging for payment, are handled directly between the buyer and seller. Alternatively, the system 12 may handle payment by instructing the buyers to  
25 forward funds or credit card billing authorization to the system, which then forwards such funds or authorization information to the seller.

Alternatively, the system 12 may also receive price information from a seller before the sub-group is closed (i.e., before the time in which to join the sub-group expires). For example, in the embodiment described above in which the buyers are grouped in real  
30 time, a seller may access the system 12, find a relevant sub-group that is being created, and input a price based on the number of buyers already in the sub-group. This may entice

additional buyers to enter the sub-group, because they will already know the price at which they can purchase the product or service, and from what seller they will be making the purchase.

It will be apparent that for some buyers, the accepted price will be less than  
5 their desired price. Assuming a seller decides to sell his product for \$75 to all forty potential buyers, as shown in the demand curve in FIG. 4, only the buyer who entered \$75 will actually pay his or her desired price. The other buyers will pay even less than their desired price.

It is also envisioned that a seller may wish to sell products for \$75, but has  
10 less than forty of the products available. If that seller is the only seller to accept the buyers' offer, then the system 12 must determine which of the buyers will receive the products. That decision can be made in many different ways. In one embodiment, assuming the seller has twenty units, the first twenty buyers who entered their offers to order are chosen as the winning buyers. Alternatively, the buyers with the highest ratings  
15 may be selected, as is described below. Yet another alternative is to allocate the products to the buyers with the highest offers to order. Also, the distribution can be done on a random basis, or in any other suitable manner. Product orders may be satisfied using multiple sellers, which may have the same or different prices. In the case of different prices, the higher price or a blended average price might be used.

20 In another situation, a seller may wish to sell his or her products for \$80, but only have twenty units for sale. In that situation, the system chooses twenty of the buyers who entered offers to order of \$80 or more, based upon one or more of the above-mentioned criteria.

In addition, if a seller decides to sell his product at a specific price, then  
25 there will be buyers whose maximum price is below the specified price. In one illustrative embodiment, the system 12 is programmed to contact the potential buyers who entered a maximum price less than the seller's specified price and provide those buyers with the opportunity to purchase at the higher price, at step 74. If one or more buyers accept, at step 76, the system transfers a list of the additional buyers to the supplier, at step 78. If  
30 not, operation terminates at step 80.

According to another illustrative embodiment of the invention, the system



12 is preferably programmed to receive data from potential buyers and assemble the potential buyers into groups based on the product(s) each buyer seeks to purchase, as is described in detail above. However, the system 12 is programmed to then request price quotes from sellers, and may optionally present the number of potential buyers for a product to the appropriate seller or supplier, without providing the seller with a demand curve or any other financial information. The system 12 solicits a quote from the seller, without providing any information to the seller such as desired prices, maximum prices, or the like. The system 12 may receive such price information from the potential buyers, as is described above, but the information is not provided to the seller.

10           When the seller provides the system with a quote, the system 12 can forward the quote to each potential buyer, with each buyer electing to either buy or not. Alternatively, in the case where the potential buyers entered price information, the system preferably compares the price quote with the desired prices (or maximum prices) entered by the potential buyers. The potential buyers who entered a desired price (or maximum price) above the price quote are deemed to accept the manufacturer's offer or given the option of accepting the offer, while the potential buyers who entered a desired price (and/or maximum price) below the price quote can be contacted and provided with the price quote, and are then given the option to purchase at the price quote. The system then combines all of the accepting buyers and provides the seller with the number of available buyers at the price quote. If the seller accepts, contact information is provided as described above to consummate the sale.

          Alternatively, the system 12 can be programmed to engage in direct negotiation with the seller. For example, if the system solicits a quote from a seller for a certain number of potential buyers, and the quote is above the desired price (or maximum price) for at least one (or some other predetermined number) of the potential buyers, the system can be programmed to automatically respond by counter-offering with the number of potential buyers at, for example, the lowest desired price of the buyers. If the seller rejects the system's offer or counter-offers at successively higher price(s), the system can respond with the lowest maximum price entered by the buyers, or some other price between the lowest desired price and the highest maximum price. In this manner, the system quickly and efficiently obtains the best price for all of the buyers, without having lengthy

delays to receive counter-offers from each potential buyer. Thus, in this embodiment, the system may still compile price information and generate a demand curve, but the demand curve is only used internally by the system to negotiate with the seller.

Optionally, the system 12 may offer a ratings service so that sellers can rate buyers, buyers can rate sellers, and the ratings information will be made available to potential buyers and sellers. Each buyer and seller can enter data regarding prior transactions with a particular seller or buyer, respectively. Such information is stored in memory 22 and is linked to the particular buyer or seller. Buyer information can be provided to a seller before making a sales decision. For example, along with the demand curve, the system may provide the seller with ratings information for each of the buyers. Thus, for example, the seller will know that of the forty potential buyers, thirty eight have strong ratings, while two have lower ratings, so that the seller can make a sales decision accordingly.

In addition, the system 12 may be programmed to deny access to buyers and sellers when their rating falls below some minimum threshold. For example, if a buyer backs out of a predetermined number of purchases, such as five, the system can prevent the buyer from entering any additional offers to order. It will be apparent to those skilled in the art that the rating option can be implemented in many different ways.

The system 12 may also include system rating of buyers, e.g., rating of the accuracy of information provided by buyers when entering new product information. Again, this rating information may be used by the system to limit or prohibit buyer access to the entire system, or portions of the system.

Furthermore, the system 12 may be programmed to limit the amount of the offers to order of buyers until they demonstrate the ability to follow through and complete purchases. For example, first-time buyers may be limited such that they cannot submit offers to order of more than \$100, and after a predetermined number of successful transactions, may be allowed to submit higher offers to order. Alternatively, the system 12 may utilize credit history data, credit limits on credit cards, and the like, and thereby determine the maximum amount of an offer to order for a buyer.

It will be apparent that the types of goods handled by the system 12 need not be limited to actual products, but can also be services such as airline tickets, maintenance

services, travel tours, financial instruments such as insurance, coupons, vouchers, certificates for discounted purchases, and the like. In addition, sub-groups can be assembled to buy a piece of property, either to be jointly owned or divided among the buyers according to the amount each pays. Moreover, buyers may be grouped to achieve  
5 a common goal, for example, to lower the costs of a service or supplier, to lower some tax, to pave a road, and the like.

It will also be apparent that the system 12 can assemble sub-groups of buyers interested in multiple products, rather than a single product. For example, the buyers for various business entities may all want a certain amount of paper goods, a certain number  
10 of pens, pencils, and the like, and can set a price each is willing to pay for the lot of products. The system 12 then generates a demand curve of those buyers, and provides the demand curve to an office supply vendor or the like. Similarly, multiple buyers of the same product can join forces and submit a single offer to order on a larger volume of product, or even submit a "meta" offer to order on a larger volume of a collection of different  
15 products.

The system 12 may also provide one or more "chat rooms", as are well known to those skilled in the art. The chat rooms may have themes, such as a television chat room, a computer chat room, and the like. Buyers may enter these chat rooms and communicate with other buyers who desire the same type of goods or services. The buyers  
20 may discuss the products, plan purchase proposals, and the like.

The system 12 may also allow buyers to access the system to check on the status of their orders, i.e., to determine whether an appropriate seller has been located and the deal finalized.

From the foregoing, it will be apparent that the electronic commerce system  
25 10 of the present invention provides a convenient, efficient system for receiving and organizing offers for orders from various buyers. The offers are then grouped and the data processed and provided to sellers and/or suppliers. By grouping potential buyers together, a savings is achieved in the purchase price paid by each buyer in the group.

The system 12 may generate revenue for the system operator in the form of  
30 any one or more of buyer registration fees, seller registration fees, product commissions, and the like.

While forms of the invention have been described, it will be apparent to those skilled in the art that various modifications and improvements may be made without departing from the spirit and scope of the invention. As such, it is not intended that the invention be limited to the illustrative embodiments set forth herein.

## WHAT IS CLAIMED IS:

1           1.    A method for facilitating purchases, comprising the steps of:  
2           collecting purchase information from a plurality of potential buyers;  
3           grouping the potential buyers into one or more sub-groups based on the purchase  
4           information entered by the potential buyers; and  
5           presenting selected information relating to at least one of the sub-groups to one or  
6           more suppliers.

1           2.    The method of claim 1, further comprising the step of generating a demand  
2           curve based on the buyer purchase information, and wherein the step of presenting selected  
3           information comprises the step of providing the demand curve to the one or more suppliers.

1           3.    The method of claim 2, wherein the demand curve includes at least one of  
2           a desired price curve and a maximum price curve.

1           4.    The method of claim 1, wherein the step of presenting selected information  
2           comprises the step of providing the suppliers with the number of potential buyers for one  
3           or more products desired by the buyers, and further comprising the steps of soliciting bids  
4           from the suppliers and receiving bids from one or more of the suppliers.

1           5.    The method of claim 1, further including the steps of receiving information  
2           from a user concerning one or more new products, creating respective sub-groups for the  
3           one or more new products, and presenting the one or more new products to potential  
4           buyers.

1           6.    The method of claim 5, wherein the step of receiving information comprises  
2           receiving information from a seller, and creating one or more sub-groups based on the  
3           information from the seller.

1           7.     The method of claim 1, wherein the purchase information relates to at least  
2 one of products and services.

1           8.     The method of claim 1, wherein the step of grouping the potential buyers  
2 comprises the step of grouping potential buyers based on two or more products.

1           9.     The method of claim 1, further including the steps of providing a chat room  
2 for users, receiving a request from a user to enter the chat room, and directing the user to  
3 the chat room.

1           10.    The method of claim 1, further including the steps of receiving a status  
2 request from a user regarding an order, retrieving information regarding the order, and  
3 presenting the information to the user.

1           11.    The method of claim 1, wherein the purchase information comprises at least  
2 one of desired price, maximum price, time information, relative preference among multiple  
3 products, and geographical information.

1           12.    The method of claim 1, wherein the step of grouping the potential buyers  
2 comprises the steps of accumulating potential buyers over a predetermined period of time,  
3 and grouping the potential buyers together based on the time period.

1           13.    The method of claim 1, wherein the step of grouping the potential buyers  
2 comprises the steps of grouping the potential buyers together until the sub-group comprises  
3 a predetermined number of buyers.

1           14.    The method of claim 4, further including the steps of providing supplier bid  
2 information to potential buyers that entered maximum prices below a supplier bid price, and  
3 soliciting orders from the buyers.

1           15.    The method of claim 4, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on the bid prices, and presenting the bid information from the selected supplier to the  
4 buyers.

1           16.    The method of claim 4, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on supplier ratings, and presenting the bid information from the selected supplier to  
4 the buyers.

1           17.    The method of claim 4, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on geographical information, and presenting the bid information from the selected  
4 supplier to the buyers.

1           18.    The method of claim 4, wherein the step of presenting selected information  
2 comprises the step of providing the suppliers with the number of potential buyers for one  
3 or more products desired by the buyers, and further comprising the step of soliciting bids  
4 from the suppliers.

1           19.    The method of claim 1, further including the steps of receiving bid  
2 information from multiple suppliers, and selecting one or more of the suppliers based on  
3 at least one of price, geographic information, and quantity of available units.

1           20.    The method of claim 19, wherein the step of selecting one or more of the  
2 suppliers comprises selecting at least two suppliers.

1           21.    The method of claim 4, further including the step of allocating goods or  
2 services to the potential buyers based on the order of entry of the purchase information by  
3 the respective buyers.

1        22.    The method of claim 4, further including the step of allocating goods or  
2 services to the potential buyers based on the respective ratings of the buyers.

1        23.    The method of claim 4, further including the step of allocating goods or  
2 services to the potential buyers based on the price information from the respective buyers.

1        24.    The method of claim 1, further including the steps of receiving bid price  
2 information from one or more suppliers, and presenting counter-offer information to the  
3 one or more suppliers, wherein the counter-offer information is calculated from the  
4 information entered by the potential buyers.

1        25.    The method of claim 1, further including the step of providing ratings  
2 information to at least one of the buyers and suppliers.

1        26.    The method of claim 25, wherein the step of providing ratings information  
2 comprises the steps of receiving ratings information from buyers relating to one or more  
3 suppliers, and providing the ratings information to other potential buyers.

1        27.    The method of claim 25, wherein the step of providing ratings information  
2 comprises the steps of receiving ratings information from suppliers relating to one or more  
3 buyers, and providing the ratings information to other suppliers.

1        28.    The method of claim 25, wherein the step of providing ratings information  
2 comprises the steps of receiving information from a buyer, and rating the buyer based on  
the information from the buyer.

1        29.    The method of claim 25, further including the step of denying access to a  
2 buyer if the rating of the buyer is below a preselected threshold level.

1        30.    The method of claim 25, further including the step of denying access to a  
2 supplier if the rating of the supplier is below a preselected threshold level.



1        31.    The method of claim 25, further including the step of limiting access of a  
2 buyer based on the rating of the buyer.

1        32.    The method of claim 1, wherein the step of presenting selected information  
2 comprises presenting the information to the seller after a preselected time in which to enter  
3 the sub-group expires.

1        33.    The method of claim 1, wherein the step of presenting selected information  
2 comprises presenting the information to the seller before a preselected time in which to  
3 enter the sub-group expires.

1        34.    A system for facilitating purchases over a computer network, the system  
2 comprising:  
3            a central computer system connected to at least one communication line, said  
4 computer system including:  
5            a memory that stores data received from one or more potential buyers; and  
6            circuitry responsive to receipt of the data from the buyers to store the data  
7 in the memory, the circuitry being programmed to group the buyers based upon one  
8 or more preselected criteria relating to the entered data, and to present selected  
9 information relating to each group to one or more suppliers.

1        35.    The system of claim 34, wherein the circuitry comprises a processor.

1        36.    The system of claim 34, wherein the circuitry is programmed to generate a  
2 demand curve based upon price information entered by the potential buyers.

1        37.    The system of claim 34, wherein the circuitry is programmed to present the  
2 demand curve to the suppliers.

1        38.    The system of claim 34, wherein the circuitry is programmed to compile a  
2 list of potential buyers for a selected product, and to present the list to one or more  
3 suppliers.

1        39.    The system of claim 38, wherein the circuitry is programmed to receive a  
2 bid from a particular supplier, determine if the bid is above a maximum price for a potential  
3 buyer, and to provide the bid information to the potential buyer if the bid is above the  
4 maximum price for the potential buyer.

1        40.    The system of claim 34, further including an interface coupled with said  
2 circuitry and configured for connection with one or more communication lines to establish  
3 communication between said system and a plurality of remote terminals.

1        41.    The system of claim 34, wherein the circuitry is programmed to receive  
2 information from a user concerning one or more new products, create sub-groups for the  
3 one or more new products, and present the one or more new products to potential buyers.

1        42.    The system of claim 34, wherein the circuitry is programmed to create and  
2 maintain a chat room for users.

1        43.    The system of claim 34, wherein the data entered by the users comprises at  
2 least one of desired price information, maximum price information, time information,  
3 information regarding relative preference among multiple products, and geographical  
4 information.

1        44.    The system of claim 34, wherein the circuitry is programmed to accumulate  
2 potential buyers over a predetermined period of time, and group the potential buyers  
3 together based on the time period.

1        45.    The system of claim 34, wherein the circuitry is programmed to group the  
2 potential buyers together until the sub-group comprises a predetermined number of buyers.

1        46.    The system of claim 34, wherein the processor is programmed to receive bid  
2 information from multiple suppliers, and select one bid based on at least one of supplier  
3 ratings, geographical information, available quantity, and bid prices.

1        47.    The system of claim 46, wherein the processor is programmed to allocate  
2 goods or services to the potential buyers based on at least one of the following: the order  
3 of entry of the purchase information by the respective buyers, the respective ratings of the  
4 buyers, and the price information from the respective buyers.

1        48.    A method for facilitating purchases, comprising the steps of:  
2 initiating one or more sub-groups based on product information received;  
3 adding potential buyers to the respective sub-groups based on purchase information  
4 entered by the potential buyers; and  
5 presenting selected information relating to at least one of the sub-groups to one or  
6 more suppliers.

1        49.    The method of claim 48, further comprising the step of generating a demand  
2 curve based on the buyer purchase information, and wherein the step of presenting selected  
3 information comprises the step of providing the demand curve to the one or more suppliers.

1        50.    The method of claim 49, wherein the demand curve includes at least one of  
2 a desired price curve and a maximum price curve.

1        51.    The method of claim 48, wherein the step of presenting selected information  
2 comprises the step of providing the suppliers with the number of potential buyers for one  
3 or more products desired by the buyers, and further comprising the steps of soliciting bids  
4 from the suppliers and receiving bids from one or more of the suppliers.

1           52.    The method of claim 48, further including the steps of receiving information  
2 from a user concerning one or more new products, creating respective sub-groups for the  
3 one or more new products, and presenting the one or more new products to potential  
4 buyers.

1           53.    The method of claim 52, wherein the step of receiving information comprises  
2 receiving information from a seller, and wherein the step of initiating comprises creating  
3 one or more sub-groups based on the information received from the seller.

1           54.    The method of claim 48, wherein the purchase information relates to at least  
2 one of products and services.

1           55.    The method of claim 48, wherein the step of grouping the potential buyers  
2 comprises the step of grouping potential buyers based on two or more products.

1           56.    The method of claim 48, further including the steps of providing a chat room  
2 for users, receiving a request from a user to enter the chat room, and directing the user to  
3 the chat room.

1           57.    The method of claim 48, further including the steps of receiving a status  
2 request from a user regarding an order, retrieving information regarding the order, and  
3 presenting the information to the user.

1           58.    The method of claim 48, wherein the purchase information comprises at least  
2 one of desired price, maximum price, time information, relative preference among multiple  
3 products, and geographical information.

1           59.    The method of claim 48, wherein the step of adding potential buyers  
2 comprises adding potential buyers to corresponding sub-groups based on the selection of  
3 particular sub-groups by the buyers.

1           60.    The method of claim 48, wherein the step of adding potential buyers  
2 comprises adding potential buyers to corresponding sub-groups based on product  
3 information entered by the respective buyers.

1           61.    The method of claim 51, further including the steps of providing supplier bid  
2 information to potential buyers that entered maximum prices below a supplier bid price, and  
3 soliciting orders from the buyers.

1           62.    The method of claim 51, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on the bid prices, and presenting the bid information from the selected supplier to the  
4 buyers.

1           63.    The method of claim 51, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on supplier ratings, and presenting the bid information from the selected supplier to  
4 the buyers.

1           64.    The method of claim 51, wherein the step of providing supplier bid  
2 information comprises the step of selecting one supplier bid from multiple supplier bids  
3 based on geographical information, and presenting the bid information from the selected  
4 supplier to the buyers.

1           65.    The method of claim 51, wherein the step of presenting selected information  
2 comprises the step of providing the suppliers with the number of potential buyers for one  
3 or more products desired by the buyers, and further comprising the step of soliciting bids  
4 from the suppliers.

1           66.    The method of claim 48, further including the steps of receiving bid  
2 information from multiple suppliers, and selecting one or more of the suppliers based on

3 at least one of price, geographic information, and quantity of available units.

1 67. The method of claim 66, wherein the step of selecting one or more of the  
2 suppliers comprises selecting at least two suppliers.

1 68. The method of claim 51, further including the step of allocating goods or  
2 services to the potential buyers based on the order of entry of the purchase information by  
3 the respective buyers.

1 69. The method of claim 51, further including the step of allocating goods or  
2 services to the potential buyers based on the respective ratings of the buyers.

1 70. The method of claim 51, further including the step of allocating goods or  
2 services to the potential buyers based on the price information from the respective buyers.

1 71. The method of claim 48, further including the steps of receiving bid price  
2 information from one or more suppliers, and presenting counter-offer information to the one  
3 or more suppliers, wherein the counter-offer information is calculated from the information  
4 entered by the potential buyers.

1 72. The method of claim 48, further including the step of providing ratings  
2 information to at least one of the buyers and suppliers.

1 73. The method of claim 72, wherein the step of providing ratings information  
2 comprises the steps of receiving ratings information from buyers relating to one or more  
3 suppliers, and providing the ratings information to other potential buyers.

1 74. The method of claim 72, wherein the step of providing ratings information  
2 comprises the steps of receiving ratings information from suppliers relating to one or more  
3 buyers, and providing the ratings information to other suppliers.

1        75.    The method of claim 72, wherein the step of providing ratings information  
2 comprises the steps of receiving information from a buyer, and rating the buyer based on  
3 the information from the buyer.

1        76.    The method of claim 72, further including the step of denying access to a  
2 buyer if the rating of the buyer is below a preselected threshold level.

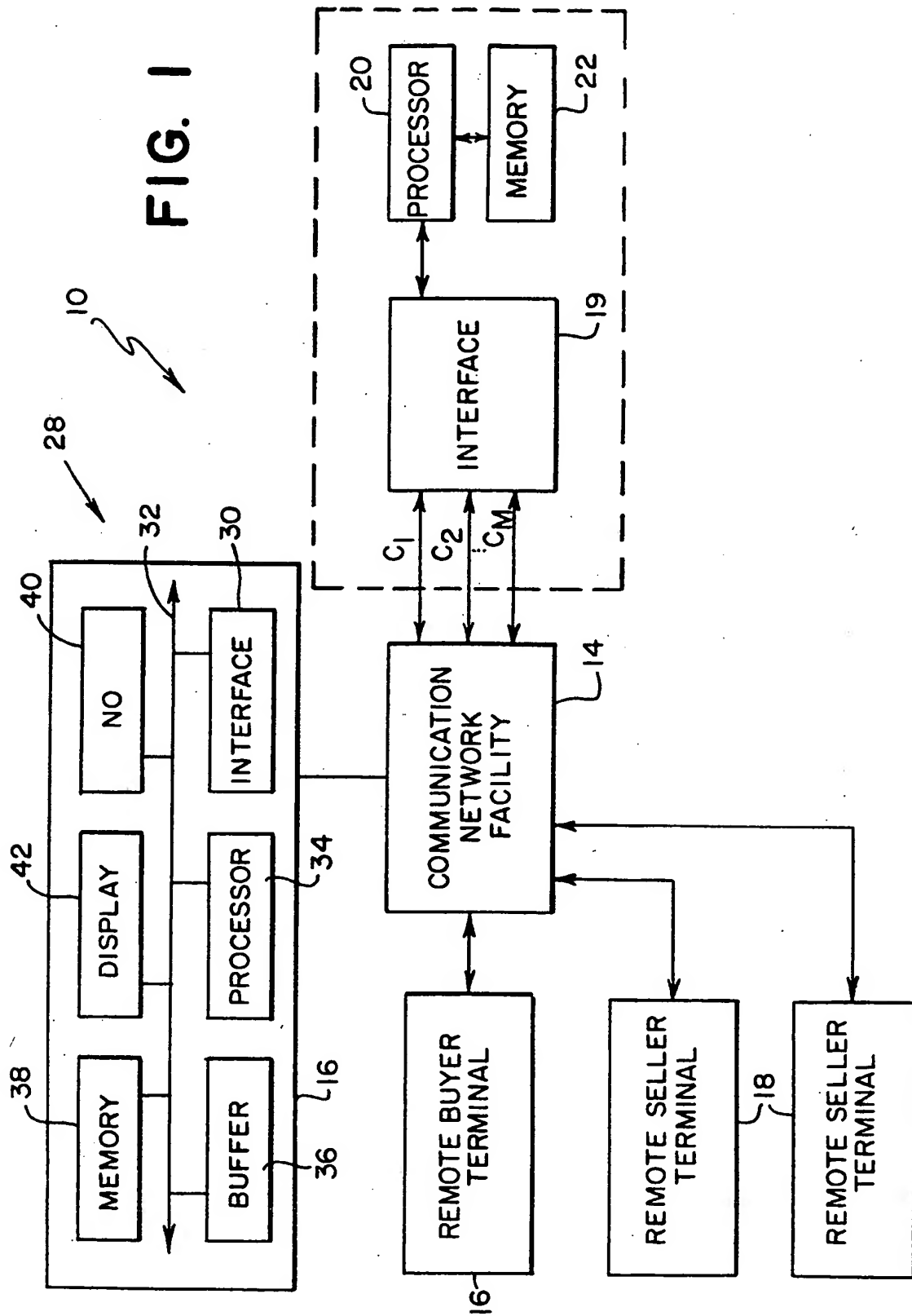
1        77.    The method of claim 72, further including the step of denying access to a  
2 supplier if the rating of the supplier is below a preselected threshold level.

1        78.    The method of claim 72, further including the step of limiting access of a  
2 buyer based on the rating of the buyer.

1        79.    The method of claim 48, wherein the step of presenting selected information  
2 comprises presenting the information to the seller after a preselected time in which to enter  
3 the corresponding sub-group expires.

1        80.    The method of claim 48, wherein the step of presenting selected information  
2 comprises presenting the information to the seller before a preselected time in which to  
3 enter the corresponding sub-group expires.

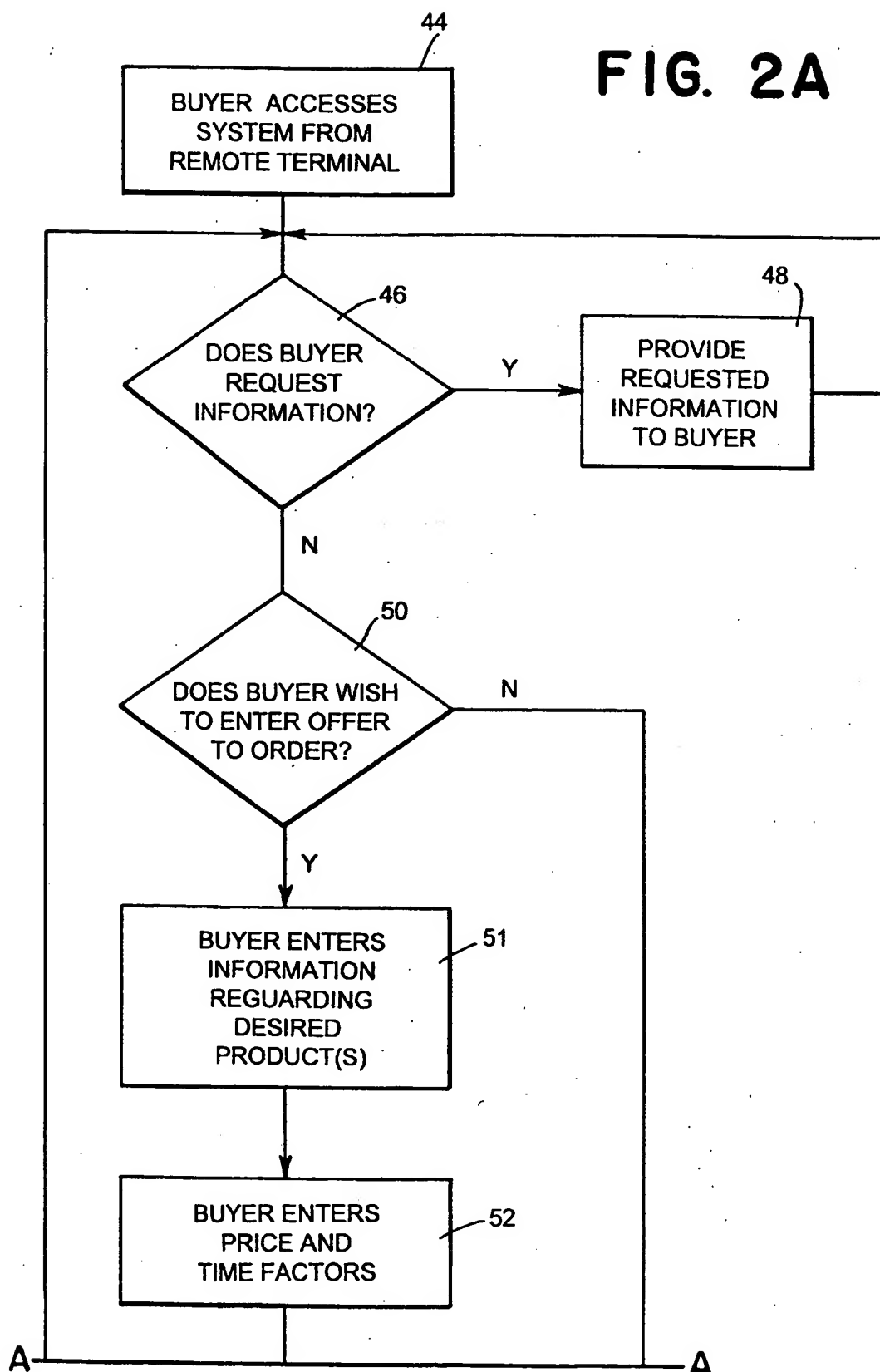
1        81.    The method of claim 80, further including the step of receiving bid price  
2 information from the supplier before the time in which to enter the corresponding sub-group  
3 expires.



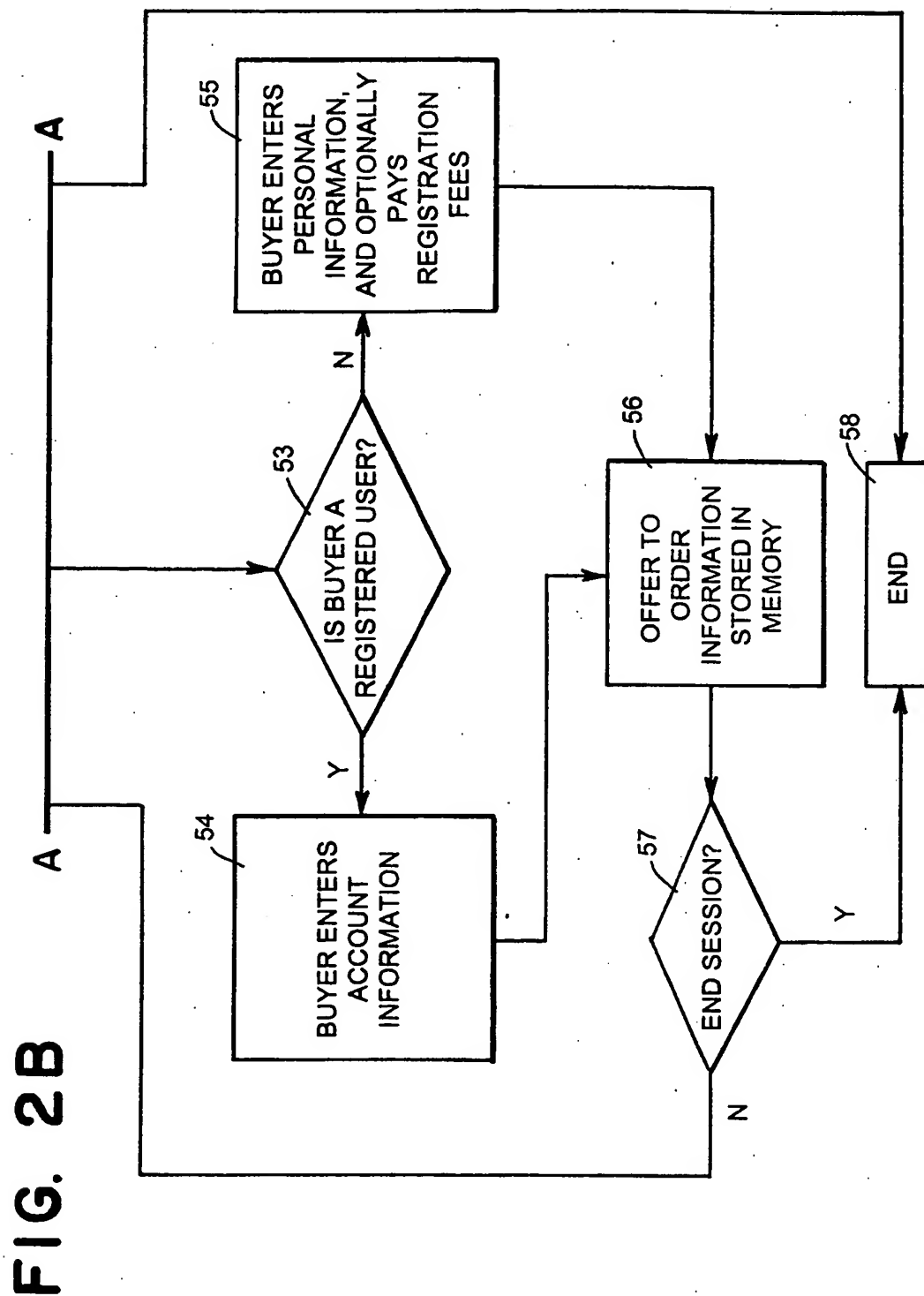


2/6

FIG. 2A

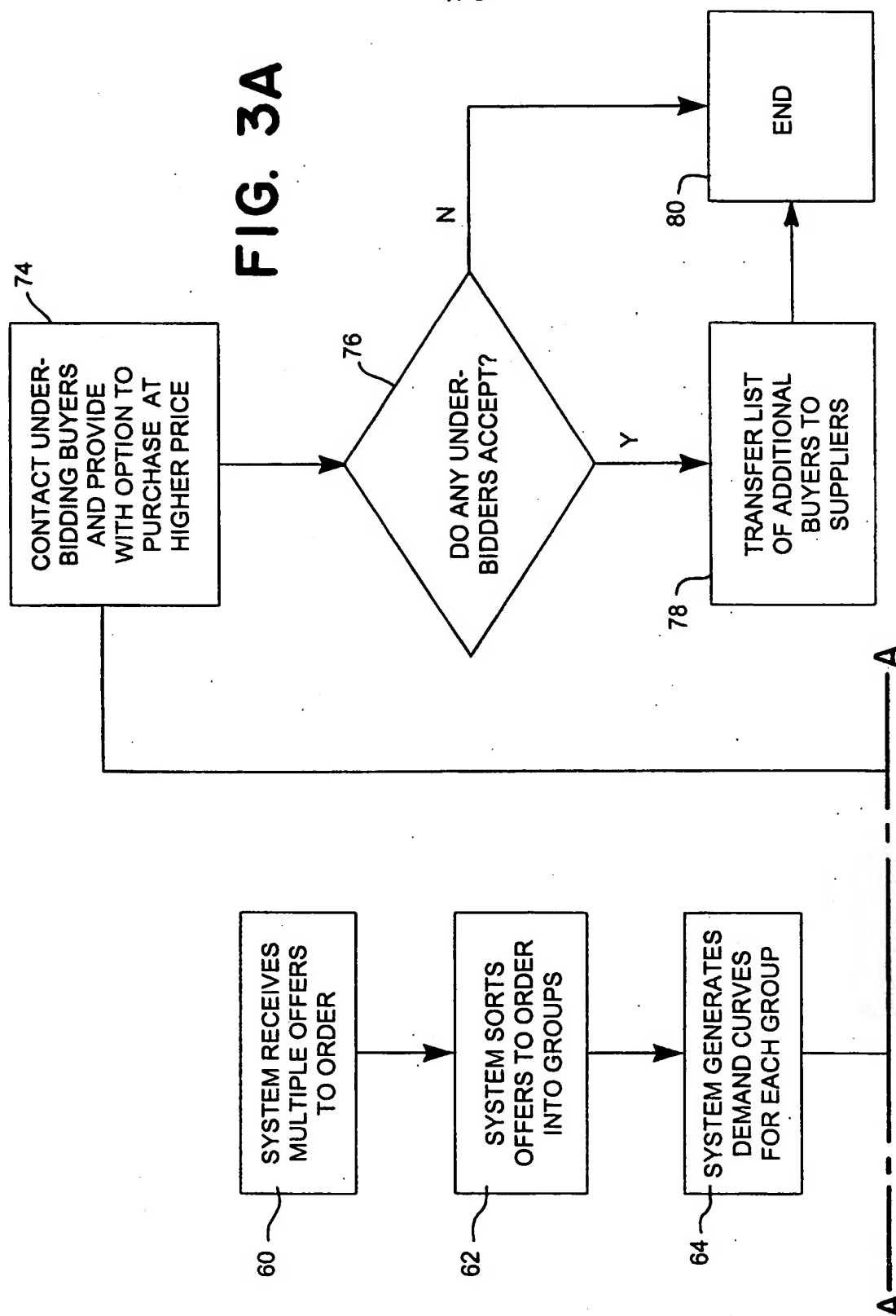


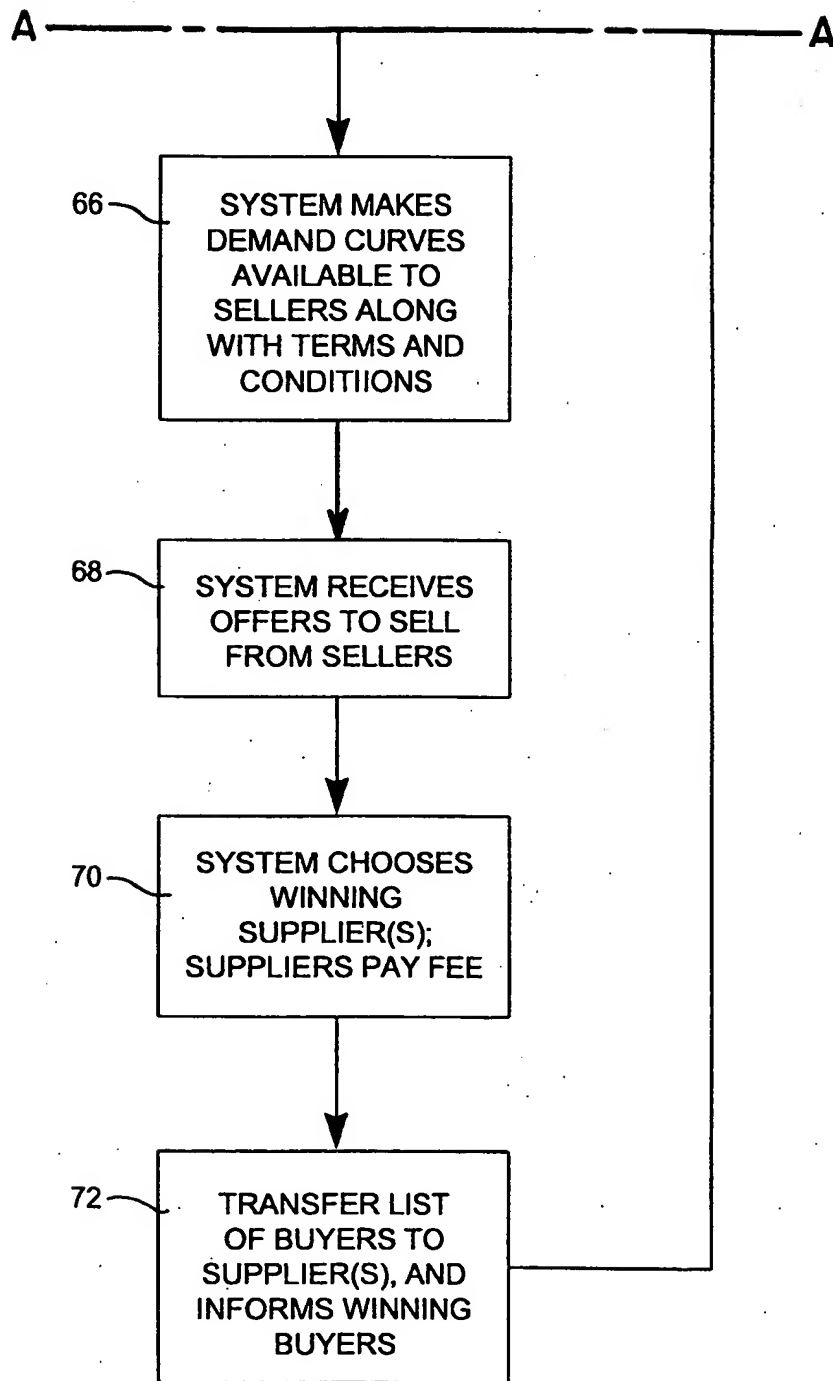
3/6



4/6

FIG. 3A



**FIG. 3B**

6/6

**FIG. 4**